IV. AMENDMENTS TO THE DRAWINGS

--- Replacement and annotated mark-up drawing sheets for amended figures showing the amended figures, if any, are attached at the Appendix hereto. Each figure is in compliance with 37 C.F.R. § 1.84. An explanation of the changes, if any, is set forth below in this "Amendments to the Drawings" section. Replacement drawing sheets are identified in the top margin as "Replacement Sheet." Any replacement drawing sheet including amended figures includes all of the figures appearing on the immediate prior version of the sheet. Any annotated drawing sheets, if the same are required by the Examiner, are identified in the top margin as "Annotated Marked-Up Drawings." Any deleted figure is noted by an instruction to delete the figure. Any corresponding amendment to the specification necessary to be made because of an amendment to the drawings in this section is made in the corresponding "Amendments to Specification" section.

- *THE DRAWINGS OF THE PATENT IS HEREBY AMENDED AS SET FORTH BELOW:*
  - *No Amendment Made to the Drawings*
  - *Attachments*: None

V. REMARKS/ARGUMENTS

- *STATUS OF THE CLAIMS*

Claims 1 and 4 – 15 remain pending in this application. Claims 11 and 14 stand currently amended.

- *OBJECTIONS*
  - *OBJECTIONS TO CLAIMS, SPECIFICATION & DRAWINGS*
    - *Examiner's Stance*

The Examiner has raised no objections to the claims, specification or drawings.

- *Applicants' Response*

N/A

- *REJECTIONS*
  - *REJECTION UNDER 35 U.S.C. §102, SECOND PARAGRAPH*
    - *Examiner's Stance*

The Examiner has rejected claims 1 – 8 and 11 – 15 under 35 U.S.C. §102(b) as being anticipated by Narusawa *et al.* (US Patent No. 6,527,173) (hereinafter referred to as "Narusawa"). The Examiner states (pages 2-3, paragraph 3 of the Office Action):

Narusawa teaches an IC card (crude card 26) and method for authenticating the IC card comprising a substrate, said substrate having a semiconductor integrated circuit (IC module 53) and one or more optical data (data in the computer generated holograms (CGHs)) deformations incorporated therein that are representative of digital data; the optical data deformations being associated with a transient optical state change security material (metal layer 36) (col. 5, line 59-col. 6, line 3);

the IC card wherein the transient optical state change material is associated with the optical data deformations to provide at least two optical data reads when the optical data deformations are read by an optical reader (col. 10, lines 5-6);

the IC card wherein one optical data read is indicative of valid data, while the other optical data read is indicative of invalid data;

the IC card wherein the deformable or deformation-derived optical data comprise pits and lands (see figures 3(b)-3(e)); and

the method of determining the locations where which transient optical state change materials are located on the authentic IC card (col. 8, lines 36-42);

the method wherein the optical data change is transient as the optical state security change material reverts back from an optical state to an initial state within a time interval; and

the method wherein the time interval between optical states may be predetermined.

Additionally, the Examiner has argued at paragraph 7 (page 5) of the Office Action:

In response to the argument that Narusawa does not teach use of a transient state change material on the card as defined in the specification of the present patent application, the examiner submits that the hologram as disclosed in the Narusawa invention is indeed formed of a state change material in that the state of the material, visually, is changed depending upon the visual perspective of the viewer toward the card. Again, such is the inherent characteristic of a hologram. Therefore, the Narusawa invention reads upon the claimed invention as broadly interpreted.

- *Applicants' Response*

Applicants disagree with the Examiner, and respectfully traverse the rejections of claims 1, 4-8, and 11-15 as being anticipated by Narusawa. To further understand the elements and to assist with construing the claims of the present invention, please refer to paragraphs [0010] and [0028], of the specification that provide support for the definition, "transient optical state change security material". Paragraph [0010] discloses that such

material is "...a material that in response to a signal from the optical reader, changes state...". Additionally, paragraph [0028], is quoted directly below (in the following quotations Applicant has added underlining for emphasis):

> "[0028] "Transient Optical State Change Security Material": refers to an inorganic or organic material used to authenticate, identify or protect an item by transiently changing optical state between a first optical state and a second optical state, and spontaneously reverting back to said first optical state after a period of time, and that may undergo such change in optical state more that one time upon read by an Optical Reader in a manner detectable by such Optical Reader".

This definition, paragraph [0028], clearly indicates operationally that the transient optical state change security material spontaneously reverts back to the first optical state from the second optical state after a period of time. Paragraph [0010] additionally clarifies the property that the transient optical state change security material changes state in response to a signal from the optical reader.

Applicants now reference Examiner's comments above, bringing attention to the teachings of Narusawa, starting at column 5, line 59 and ending at column 6, line 3. In referring to the optical deformations of Narusawa, the Examiner states at paragraph 2, page 3: "...the optical data deformations being associated with a transient optical state change security material (metal layer **36**)..." By this recitation, Examiner is stating that metal layer **36** is a "transient optical state change material". Applicants strongly disagree. With respect to any definition the teaching of Narusawa dispositively shows that metal layer **36** is not a transient optical state change material.

Examiner will immediately recognize, that as taught by Narusawa, metal layer **36** is electroplated onto the surface of etched photoresist **32** which resides atop substrate **30**. When the substrate and photoresist are later removed, modified metal layer **36**, now **36A**, is used as a "stamper" for an injection molded press. Once created, this stamper is used to repetitively form secondary recording media. Upon pressing, layer **36A** leaves a complementary hologram on melted polycarbonate bead **40**, that is spread and subsequently forms the rugged surface of main substrate **40A**. Furthermore, "...The rugged surface of the

main substrate **40A** is covered with a protective layer of aluminum, not shown, processed by an aluminum sputtering process…" (Narusawa, column 6, lines 16-19).

The Examiner will realize that metal layer **36** does not function subsequently to pressing, and does not constitute a "transient optical state change material" when probed later by a reader. Without ambiguity, at that point, no part of metal layer **36** is present on the the card that comprises the invention of Narusawa. Respectfully, the examiner will thus recognize that Examiner's assertion that metal layer **36** is an transient optical state change security material is incorrect.

Examiner asserts that the following elements of Narusawa are common with the instant invention, referring to said optical state security material, metal layer **36**: "the method wherein the optical data read is transient as the optical state security material reverts back from an optical state to an initial state within a time interval; and the method wherein the time interval between optical states may be predetermined."

Applicants have been unable to find basis in Narusawa for these assertions and request that the Examiner provide specific locations in Narusawa wherein such statements might be supported. However, with respect to these assertions, Applicants have demonstrated that metal layer **36** is not a transient optical state change security material. Thus, the two methods, as recited by the Examiner in this paragraph, cannot exist. They depend on metal layer **36**, which is non-functional in such a capacity.

In a subsequent paragraph of the Office Action (paragraph 7, page 5), the Examiner has also asserted that holograms, broadly interpreted, comprise transient optical state change security materials. We note that the Examiner's assertions are inconsistent in this regard, having previously argued that metal layer **36** is an optical state change security material.

Applicants quote directly from Narusawa at column 1, lines 37-42, that directly disclose the inherently intransient nature of said holograms:

> "In order to improve security of a personal ID card, a hologram, which has irreversibility such that information can not be rewritten although new information can be recorded additionally, is utilized for the [pe]rsonal ID card."

Narusawa additionally states at column 17 lines 45-49:

"According to the aspect of the present invention, there [is] provided a card issuing system, which issues a personal ID card utilizing an irreversible hologram. Therefore, the personal ID card is highly secured and hard to counterfeit."

Narusawa further states at column 9, line 8:

"...CGH **28** is a nonvolatile memory..."

These quotations from Narusawa express the intransient and irreversible nature of a hologram, when formed, and the value of this non-volatility in providing a secure card. It is well known in the art that, once formed, a hologram is a static diffraction pattern carrying recorded wavefront information. Applicant points out Narusawa's unambiguously strong assertion on this inherent quality and it's importance to that invention.

In traversing Examiner's rejection regarding this point, Applicants note that Examiner now argues counter to this express quality of Narusawa, that a hologram of Narusawa, broadly interpreted, is a "...state change material in that the state of the material, visually, is changed, depending upon the visual perspective of the viewer toward the card....", and that "...the optical security state change material reverts back from an optical state to an initial state within a time interval..."

In contrast to the Examiner's assertions as demonstrated directly above, the inherent inventive feature of Narusawa is that the computer generated holograms are unchangeable, that is, not changeable . This fact is key to Narusawa' invention. The CGHs provide a stable optical signature. Narusawa cites "irreversibility", which is commonly understood in this context to mean that the CGH's have constant and non-volatile optical properties once initially formed. This inherent property of the CGH's as utilized by the invention is directly opposite that stated by the Examiner. The Examiner argues that a CGH is a changeable element.

Applicants further note that, properly construed within the definition of paragraph [0028], quoted above and supported by paragraph [0010], that the transient optical state change security material defined in the instant invention: 1) reverts spontaneously to the first optical state from the second optical state and 2), that such material changes transiently in response to a signal from the optical reader.

Examiner's broad assertion that a hologram is a transient optical state change security material is deficient on both these points, because inherently a hologram is not capable of reverting spontaneously from one optical state to another. Furthermore, in the argument presented by the Examiner, the "reader" is the comprehending human eye. In that example, clearly the signal does not emanate from the human eye, as required. It is well known that the human eye is a receptor of optical signals, not a transmitter. In the case cited by the Examiner, light energy would have to be transferred from the eye ("the reader") to the hologram, thereby changing the state of the hologram, a physical impossibility.

Thus, even as very broadly interpreted, the invention of Narusawa does not contain the element of a transient optical state change security material. For anticipation under 35 U.S.C. 102(b), the anticipating reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present.

All the rejected claims contain the limitations of base claim 1. Base claim 1 of the instant invention includes the element of "a transient optical state change security material". This teaching regarding a transient optical state change security material, present in the instant invention, is absent from the Narusawa reference for the reasons cited *supra*. For this reason alone, by law a 102(b) rejection cannot apply to the invention as disclosed and/or claimed in claims 1, 4-8, and 11-15.

- OBLIGATIONS UNDER 37 C.F.R. 1.56

  - *Examiner's Stance*

The Examiner has noted the obligation of the Applicants under 37 C.F.R. 1.56 to identify the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made, as well as other obligations under the regulation.

  - *Applicants' Response*

Applicants note all of their obligations under 37 C.F.R. 1.56.

- *REJECTIONS UNDER 35 U.S.C. §103(a)*

  - *Examiner's Stance*

The Examiner has rejected claims 9 and 10 as being unpatentable over US Patent No. 6,527,173 to Narusawa in view of Setani (US Patent No. 4,963,464). The examiner asserts:

> The teachings of Narusawa have been discussed above.
>
> Narusawa lacks the teaching of pits comprising two distinctly different depths.
>
> Setani teaches an IC card comprising a substrate having one or more optical data deformations wherein pits of the optical deformations comprise two distinctly different depths (see figures 5 and 8).
>
> One of ordinary skill in the art would have readily recognized that providing the invention of Narusawa with pits having two distinctly different depths would have been beneficial for increasing the amount of data incorporated into the card. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify the teachings of Narusawa with the aforementioned teaching of Setani to expand the card's storage capabilities.

Examiner additionally argues:

> In response to applicant's argument that there is no suggestion to combine the Narusawa and Setani references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the suggestion to combine the teachings of Narusawa with the pits comprising two distinctly different depths as taught by Setani is found in knowledge generally available to one of ordinary skill in the art.

- *Applicants' Response*

Inter alia, because the combination of Narusawa over Setani does not contain in conjunction all the key elements of claims 9 and 10, and because those that exist cannot be combined to form the invention, Applicants respectfully traverse the Examiner's rejections of claims 9 and 10.

By the Examiner's own words, the Examiner "...recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art." The Examiner argues "...in this case, the suggestion to combine the teachings of Narusawa with the pits comprising two distinctly different depths as taught by Setani is found in knowledge generally available to one of ordinary skill in the art."

With respect to "general available knowledge" suggestions to combine the references of Narusawa and Setani, Applicants are unaware of this general knowledge. As such, Applicants respectfully request that the Examiner provide specific references to such knowledge so that Applicants might opportunely rebut such suggestions.

Examiner asserts that one of ordinary skill in the art would recognize that combining the pits of different depths (Setani) with the "pits" of Narusawa would benefit the card's storage capacity. Examiner has asserted that the medium consists of a plurality of holograms situated on the card. Applicants disagree with the Examiner, however, that there are "pits" in the invention of Narusawa, as the term is commonly used by one of ordinary skill in the art.

According to common usage in the art, a "pit" is a physical modification in a recording substrate; the pit modifies the reflectivity or other optical property of the medium, in comparison to a "land", which is the absence of a pit.

Highly formalized, published industry standards, such as the International Standards Organization (ISO) standard 9660, ISO standard 13490-1, the International Electrotechnique Commission (CEI-IEC) standard 908, and ISO/IEC standard 10140, define the characteristics and functional qualities of compact disc optical media and the functional pit and land structures therein. A critical defining feature of pits and lands that is directed by the standards is that such elements have sharp, well defined boundaries. Only in that case it is

possible to determine where a land ends and a pit begins, and also where a land ends and a pit begins. The well-defined boundary between the pits and the lands is known as an edge.

By common usage of "pit", no such feature as a "pit" exists on the card of Narusawa. Applicants firstly note that as taught by Narusawa, no mention of "pit" is made. Narusawa discloses, for example, a "rugged surface" formed by the etched photoresist (column 6, line 1) and mentions that "The rugged surface of the main substrate **40A** is covered with a protective layer of aluminum, not shown, processed by an aluminum spattering process." (column 6, lines 16-19), but does not utilize the word "pit", as would be expected. A "rugged" surface would not conform to commonly understood definitions for pits and lands, especially with respect to edge delineation.

This is demonstrated by the following two illustrations, one taken from US 6,519,213 B1 (Figure 1) and one taken from Narusawa (Element **1003**, Figure 2). "Fig. 1" shows a track of well-formed indentations comprising standard-conforming pits and lands. In contrast, the Examiner would recognize that, a hologram, properly formed, requires apparently disorganized, smoothly varying analog elements of depth and curvature in two dimensions, as illustrated by hologram **1003**, shown below. Such convoluted structures could not be conformal with generally understood standards for pits and lands.

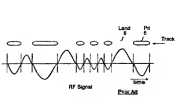

FIG. 1

Applicants secondly point out that by generally understood standards, a holographic optical signal is not formed by "transitions between pits and lands and the timing between such transitions", representing channel bits, as would be expected if the invention of Narusawa comprised pits and lands.

With respect to the teaching of Narusawa over Setani, there are other errors in Examiner's obviousness rejection of claims 9-10. Setani teaches pits of distinctly different depths, and a plurality of reader beams, one beam for each type of pit. To function properly, each interrogating beam must be of a different wavelength; the beams are independently

modulated by the pits. In contradistinction, Narusawa teaches the use of holographic elements and the use of monochromatic light to interrogate such elements.

Thus, as taught, the combination of elements of Narusawa and Setani would not function. The invention of Narusawa requires monochromatic light of fixed wavelength; the invention of Setani requires a plurality of independent reader beams, each of a different wavelength. Conversely, the invention of Setani would not function using monochromatic light, because each pit type would require radiation of a different wavelength.

In similar vein, placing the holographic elements of Narusawa at different depths would not increase the storage capacity of Narusawa's card. As one of ordinary skill in the art understands, the storage capacity would be decreased relative to the highest placement of the holographic elements. Displacing a hologram along the Z-optical axis away from the observer decreases angular size of the apparent wavefront from the viewer's perspective. The net effect is that holographic information is lost, compared to a the same hologram when viewed from a closer perspective.

Another error in Examiner's argument is related to the discussion on pages 9 -13 of this amendment, a discussion that shows persuasively that Narusawa lacks the element of a "transient optical state change security material". This is one element of the instant invention. We have noted above that the Examiners assertions have been inconsistent on this matter, in first case claiming that metal layer **36** was such a material, and in the later case that the holograms of Narusawa were such materials.

Applicants showed dispositively that metal layer **36** is not such an element because it is absent in Narusawa's card. It was also shown that the holographic elements as taught be Narusawa are not such elements. Narusawa requires for security purposes that the holographic elements be irreversible and unchangeable; that is, they provide a stable optical signature. This is opposite the function of a transient optical state change security material as taught herein, because such an element must change optical state in response to a signal from the reader beam and then spontaneously revert back to that initial state.

For the preceding reasons, Applicants respectfully traverse the Examiner's rejections of claims 9-10. As required by U.S.C. 103(a), the combination of elements found in Narusawa and Setani are deficit in number with respect to the elements of invention inherent

in claims 9-10, and those elements that exist are contradictory in combination, either between themselves, or with respect to claims 9-10. It would therefore be non-obvious to combine even these elements by one possessing ordinary skill in the art.

CONCLUSION TO REMARKS

Applicants assert that this response is fully responsive to the Examiner's office action dated November 16, 2005 in the filing of the RCE application herewith. Applicants respectfully seek early allowance of the pending claims.

Respectfully Submitted,

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VI. APPENDIX

- *No appendix is intended to be attached*